National 5

Homework RE2

1. Solve each of these equations:

   (a) $3(x+3)+2(x+1)=31$ (b) $4x-(x-2)=18-3x$

2. Solve these inequalities

   (a) $5+2(1+3x)\leq 37$ (b) $4(t-3)-17\leq -3(t-1)$

3. (a) Draw an accurate graph of each of these straight lines

   (i) $x+y=8$ (ii) $x=5$

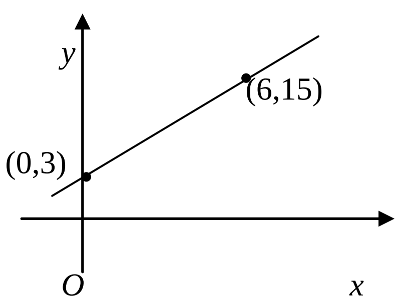
   (b) Write down the coordinates of the point of intersection of these two lines.

4. Find the gradient and y-intercept of each of these straight lines

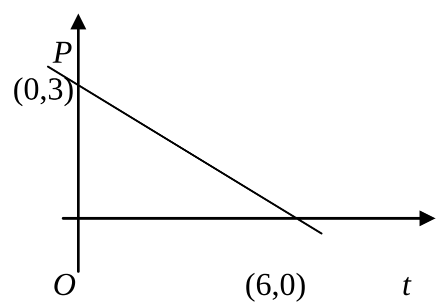
   (a) $y=10-x$ (b) $3x+4y=24$

5. Find the equation of each of these straight lines:

   (i)



   (ii)



6. The following number patterns can be used to sum consecutive square numbers:

$$1^2+2^2=\frac{2\times3\times5}{6};\qquad 1^2+2^2+3^2=\frac{3\times4\times7}{6};\qquad 1^2+2^2+3^2+4^2=\frac{4\times5\times9}{6}.$$

   (a) Express $1^2+2^2+3^2+4^2+\cdots\cdots+10^2$ in the same way.
   (b) Express $1^2+2^2+3^2+4^2+\cdots\cdots+n^2$ in the same way.

7. Simplify:

   (a) $\dfrac{3x-12}{x^2-16}$ (b) $\dfrac{a^2-2a+1}{a^2-1}$.

8. Rationalise the denominator

(a) $\dfrac{6}{\sqrt{3}}$ (b) $\dfrac{5}{2\sqrt{2}}$

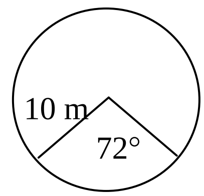
9. An aircraft weighs t tonnes when fully loaded. It uses f tonnes of fuel per hour. If the weight of the aircraft after h hours of flight is W tonnes, write down a formula for W.
Hence calculate W when $t = 14$, $f = 0\cdot 25$ and $h = 3$.

10. The points A and B have coordinates (a, a^2) and $(2b, 4b^2)$, respectively.
Determine the gradient of AB, expressing your answer in its simplest form.

11. Evaluate, without a calculator

(a) $3\cdot 8 - 7\cdot 36 \div 8$ (b) $3\cdot 15 \div 300$ (c) $12\cdot 5\%$ of £140

12.

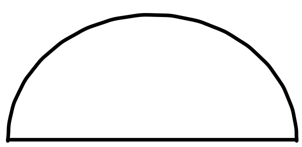


12. Find the area of the sector shown, leaving your answer in terms of π.
The radius is 10 m.

13. (a) Simplify $b^{1/3}\ b^{5/3} - b^{2/3}$.

(b) If $b = -2$ evaluate this expression.

14.



The sketch shows a semicircle and diameter.
The radius of the semicircle is r units.
If the area of the figure and the perimeter of the figure are numerically equal, show that

$$r = \frac{4}{\pi} + 2.$$